

RESTRICTED

**PILOT'S HANDBOOK
MODEL NE-1**

**RELEASED BY THE BUREAU OF AERONAUTICS
NAVY DEPARTMENT**

**PIPER AIRCRAFT CORPORATION
LOCK HAVEN, PENNA.**

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Report No. 345

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June 30, 1942

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FOREWORD

The information contained in this booklet is intended to give the pilot, who is flying the NE-1 airplane for the first time, a brief outline of the principal operating features of the airplane.

A more detailed description of the airplane in general is contained in the "Service Manual," a copy of which is furnished with each airplane.

DESCRIPTION OF OPERATION OF AIRPLANE

The NE-1 airplane may be taken off, flown and landed in the manner of all conventional airplanes of this type.

The flying characteristics of the airplane are normal in all respects, there being no special features incorporated that would require special attention.

Note: In cases where Technical Notes or orders are specified, the latest revision applies.

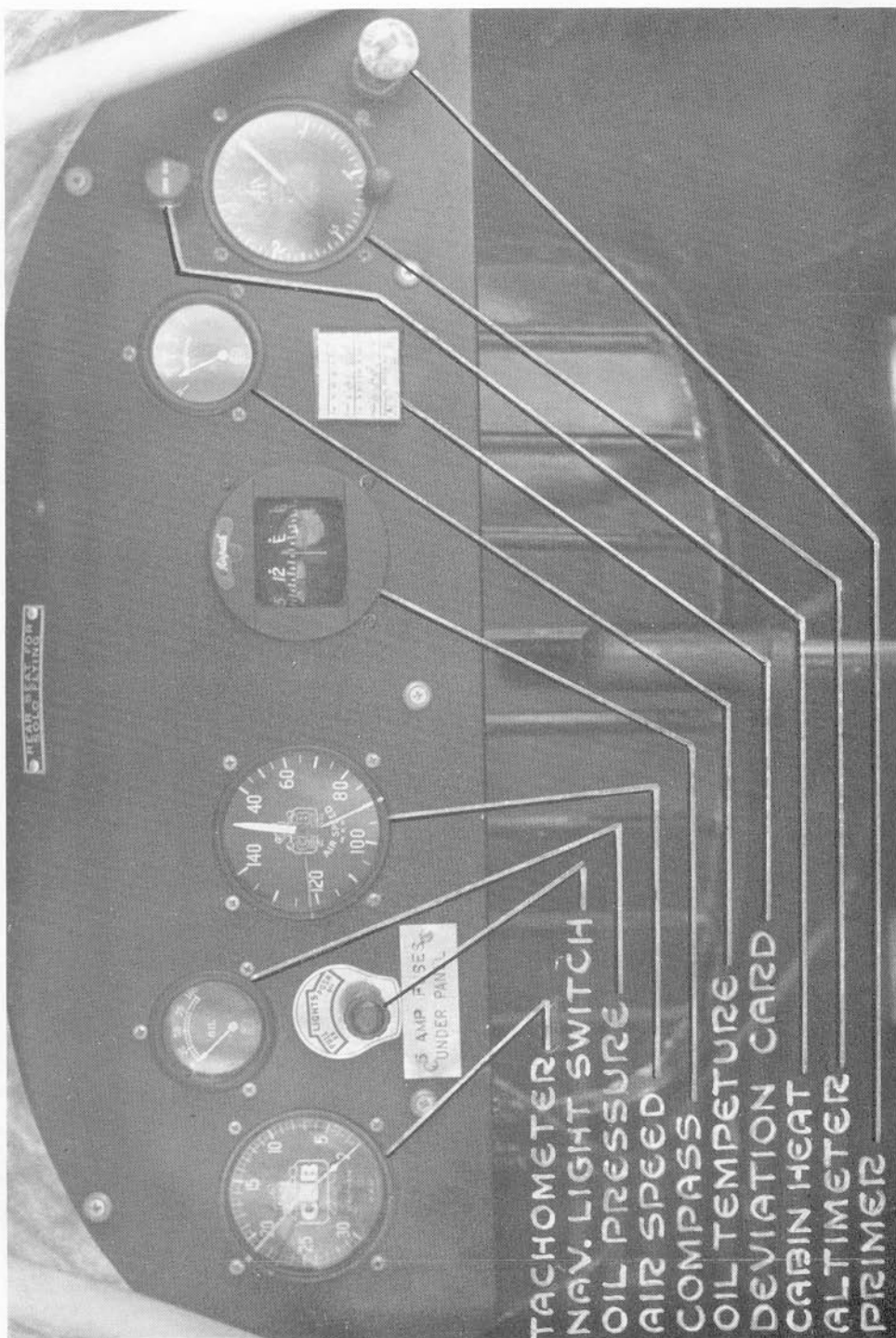
TABLE OF CHARACTERISTICS

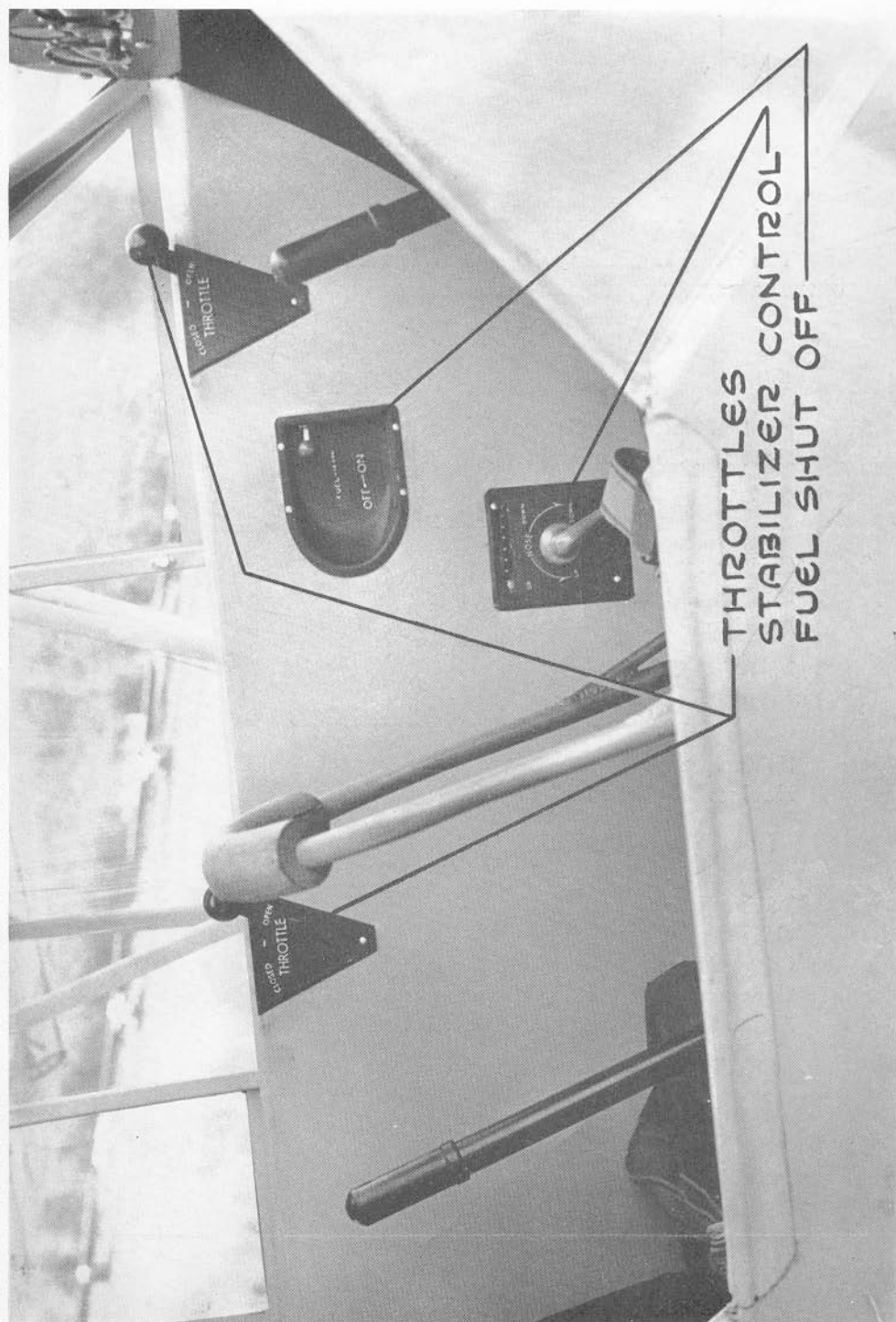
(Based on Gross Weight)

Gross Weight	1160 lbs.
Full Speed at Sea Level	87 MPH
Stalling Speed at Sea Level—Power Off	38 MPH
Climb to 5000 feet	15 min.
Service Ceiling	9800 ft.
Endurance at Cruising	2.5 hrs.
Endurance at Full Speed	2.2 hrs.
Take-Off Distance—Normal	605 ft.
Wing Loading	6.57 lbs.
Power Loading (at 65 HP)	18.05 lbs.
Wing Area Total	178.5 sq. ft.
Wing Span	35'2.5"
Fuel Capacity—Total	12 gals.
Oil Capacity—Total	1 gal.



MODEL NE-1





CABIN ARRANGEMENT AND CONTROLS

The location of the various controls are shown on the photographs of the cabin, on pages 5 and 6, and include the following:

FLYING CONTROLS

Stabilizer Control
Pilot and Co-Pilot Control Sticks
Pilot and Co-Pilot Rudder Pedals

POWER PLANT CONTROLS

Carburetor Air Heater
Fuel Tank Shut-Off Valve
Ignition Switch
Primer Pump

AUXILIARY CONTROLS

Cabin Heater
Navigation Light Switch

INSTRUMENTS

Tachometer
Oil Temperature Gauge
Oil Pressure Gauge
Compass
Altimeter
Fuel Gauge

FLYING CONTROLS

The angle of the stabilizer is controlled from the cabin by means of a hand crank located on the left side of the cabin. The stabilizer can be adjusted plus or minus 2 degrees and 30 min. from its neutral position to provide the necessary longitudinal balance for various loading conditions. The direction of movement of the airplane nose, and hand crank, is noted on the hand crank placard. An indicator gauge is provided above the hand crank to show the stabilizer setting at all times. Experience will indicate the best setting for the particular load condition.

POWER PLANT CONTROLS

Carburetor Air Heater Control

A valve in the air scoop below the carburetor permits taking heated air from the exhaust manifold shroud into the carburetor. The control is located on the right side of the cockpit just forward of the cabin enclosure door, and is pulled out to obtain higher air temperatures in the carburetor. The use of a carburetor air heater is necessary to prevent or remove ice formation in the carburetor or around the throttle valve, but causes a loss in power and should, therefore, only be used when necessary.

Fuel Shut-Off Valve

The fuel shut-off control is of the push-pull type, and is located on the left side of the cockpit. A placard is provided stating the fuel capacity and the operation of the valve.

Ignition Switch

The ignition switch is located in the cabin roof on the left side of the cabin. The switch is of the dual magneto type which permits the use of either magneto separately or both together. **Note:** Do not operate on either single magneto for more than 30 seconds at a time.

Fuel Gauge

The fuel gauge is of the wire float type and is located directly in front of the windshield. The amount of remaining fuel may be estimated by the amount of wire showing above the tank filler cap.

Oil Gauge

The oil gauge is of the stick type and is attached to the oil tank filler cap. The amount of oil in the oil tank may be determined by removing the oil filler cap from the engine oil sump in the engine

compartment, and noting the oil level with respect to the graduations on the oil stick. Graduations are in quarts of oil.

Hand Fire Extinguisher

A hand fire extinguisher is mounted on the cabin floor beneath the front pilot's seat, and is accessible to both the pilot and co-pilot.

Engine Control Unit

The engine control unit consists of dual throttles remotely connected. The throttles are located on the left side of the cabin, and are placarded for identification and operation.

AUXILIARY CONTROLS

Cabin Heater

The cabin heater control is of the push-pull type, and is located on the instrument panel in the upper right corner. A placard is provided for its identification and operation.

Navigation Light Switch

The navigation light switch is of the single pole, single throw type and is located on the lower left side of the instrument panel. A placard is provided for its identification, operation, and the location of its fuses.

POWER PLANT OPERATION

Engine—Continental 0-170-2.

The engine is a 4-cylinder opposed, direct drive, maximum rating of 65 HP at 2300 RPM at sea level.

Gear Ratio—Direct Drive.

Fuel—Min. 73 Octane in accordance with specification AN-VV-F-761.

Oil—In accordance with AN-VV-O-446, Grade 1080. See T. O. 24-41.

Propeller

Sensenich Model 72C42.

Wood, two blades, fixed pitch.

Diameter 72 inches.

Note: The propeller pitch is such that at full throttle level flight 2300 RPM will be exceeded. Do not exceed 2300 RPM. At take-off and best climb speed full throttle will not cause overspeeding.

Starting

Refer also to Continental Operator's Handbook.

1. Pull engine through by hand 3 to 4 complete revolutions if engine has been standing for more than 1 hr.

2. Close throttle.

3. Prime Engine—Use 3 to 5 strokes of primer pump.

Note: 1. Over-priming should be avoided to prevent the danger of washing the lubricating oil from the cylinder walls.

2. If temperature is 75 degrees or above (normal summer temp.) priming of the engine is not necessary if the throttle is opened approximately one-eighth of an inch.

5. **Switch Off**—Turn engine by hand five or six times with throttle closed.

6. Turn ignition switch "ON" (Dual Magneto Switch is "ON" when turned to "BOTH.")

7. Start Engine by pulling propeller through, counter-clockwise. This should be done with a quick snap to prevent propeller from kicking back.

Note 1: If engine fails to start the above procedure should be repeated.

Note 2: If engine loads up, the ignition switch should be turned off, throttle opened, and engine turned backward (clockwise) to unload cylinders.

Note 3: After engine starts, immediately increase throttle to amount required to prevent backfiring and to maintain operation.

Warming Up

1. Observe oil pressure carefully during the warm up period. If gauge fails to show oil pressure within 30 seconds after starting, stop the engine immediately and correct the trouble before continuing operation.

2. When engine is operating smoothly, reduce throttle and continue operation for warm up period (3 to 5 mins.) at 700 to 900 RPM. Gradually increase engine speed until normal operating temperature is reached, which should be accomplished under normal conditions within 5 to 15 minutes.

3. Throttle should not be opened wide until the oil temperature is within 20 degrees of normal operating temperature. Normal operating temperature is 110 to 120 degrees F.

Note: It is recommended that prolonged operation with oil temperature below 90 degrees be avoided.

4. Prolonged periods of operation at idling and full throttle on the ground should be avoided.

5. Test each magneto of dual ignition engines individually, the engine speed should not drop off more than 75 RPM. Do not operate on either single magneto for more than 30 seconds at a time.

Take Off

1. Set stabilizer to suit loading condition.

2. Do not use carburetor heat on take-off except in icing conditions.

3. If taxiing on dusty fields, however, use carburetor heat until point of take-off is reached. This will help prevent dirt and dust from going in the carburetor.

4. Use full throttle for take off.

Climb

1. Reduce RPM after gaining sufficient altitude by gradually pulling throttle back. (Normal after obtaining 1000 ft.)

2. Best indicated climbing speed is approximately 55 MPH.

Note: Full throttle climbing at air speeds much in excess of 55 MPH will cause 2300 RPM to be exceeded.

Cruising

1. Maximum recommended cruising limits are approximately 150 to 250 RPM less than full throttle.

2. Oil temperature should not exceed 215 to 220 degrees F.

3. Oil pressure should not fall below 20 lbs.

4. Engine ices up and stops very easily at low powers even in warm weather. Use carburetor heat when closing throttle or when operating at very low powers in damp weather.

Landing

1. Apply carburetor heat.

2. Reduce engine RPM to not less than 800 to 1000 RPM. The throttle should be left slightly open. This will prevent the engine

from cooling too rapidly, and will help keep the engine from loading up with danger of stopping.

3. Set stabilizer to suit.
4. For prolonged glides—clear engine every 500 feet by opening the throttle.
5. Before landing engine speed should be reduced to idling speed.
6. Airspeed should be reduced to approximately 55 MPH. Flairing the glide approximately 10 feet from the ground will prevent excessive “floating.”

Note: If engine stops it cannot be started by diving. The high compression peaks and light propeller on this engine prevent wind-milling even at diving speeds.

Stopping

1. Close throttle.
2. Close fuel valve and allow engine to idle until gas runs out. This permits an even and slow cooling of the engine parts.
3. When engine stops, turn ignition switch “OFF.”
4. Do not cut ignition switch immediately after landing, as this tends to cool the engine too rapidly.

Fuel System

The fuel system consists of a 12 gallon tank located between the firewall and the instrument panel. A 2 oz. fuel strainer is provided on the engine side of the firewall for purposes of draining the fuel system, and to keep any dirt, sediment, or water from entering the carburetor. This strainer should be kept clean at all times. At cruising speed the 12 gallons of fuel is sufficient for 2.5 hrs.

Oil System

The oil system is an integral part of the engine, and may be drained by removing the drain plug from the bottom of the oil sump.

Average oil temp.	110 to 120 deg. F.
Max. oil temp.	220 deg. F.
Min. oil temp.	90 deg. F.
Average oil Press.	32 lbs.
Min. oil Press.	20 lbs.

Electrical System

The electrical system consists of navigation lights, switch, fuse and spare fuse, and battery.

Balance

No ballast is required for any flight condition, as variation in longitudinal balance can be compensated by adjusting the stabilizer to suit. However, solo flying should be from the rear seat. The baggage compartment located aft of the rear seat is capable of carrying 20 lbs.

Useful Load Carried

Crew	380 lbs.
Gasoline—12 gals.	72 lbs.
Oil—1 gal.	8 lbs.
Misc.	3 lbs.
Total	463 lbs.

Note: Other combinations of useful load items may be made, provided the gross weight does not exceed 1160 lbs.

First Aid Kit

The first aid kit is located in the upholstery pocket in back of the front pilot's seat.

FLYING CHARACTERISTICS

Take-Off

The take-off characteristics of the NE-1 airplane are quite normal, and satisfactory. The check off list below may be of assistance:

1. Fuel valve on.
2. See that there is no interference with the flight controls in either cockpit.
3. Set stabilizer (optional).
4. Turn carburetor air heat control—cold*.
5. Parachute fastened.
6. Belt on.
7. Start and warm up engine as described on pages 10 and 11.

* Except in icing condition.

Maneuvers

The NE-1 airplane has been demonstrated to perform satisfactorily the normal flying and maneuver tests for non-air carrier aircraft, as specified by the Civil Aeronautics Administration.

The following maneuvers are satisfactorily performed:

1. Vertical bank.
2. Loop.
3. Aileron roll. (See Note 2.)
4. Snap roll. (See Note 2.)
5. Normal stall.
6. Normal spin (6 turns to right or left with recovery in $1\frac{1}{2}$ turns.)

Note 1: Maneuvering speed is 80 MPH and all maneuvers should be conducted or entered below this speed.

Note 2: Aileron roll and snap roll are to be performed only by competent pilots instructed in these maneuvers in the subject aircraft.

Note 3: Violent acrobatics and abrupt pull-ups are not to be performed in this aircraft.

Note 4: Diving of aircraft at maximum placarded air speed in rough air is to be **avoided**.

Note 5: This engine ices up and stops very easily even in warm weather. When closing the throttle for any maneuver, especially in damp air, always use carburetor heat.

Note 6: If engine stops in flight for any reason, do not try to start it by diving. This engine will not windmill due to high compression peaks and light propeller. Diving only gives excessive speed with subsequent floating and overshooting of the forced landing; however, because of the normally low gliding speed, even a moderate head wind may steepen the glide sufficiently to cause danger of under-shooting.

